

AMENDMENT TO THE CLAIMS

E/ 1. (Currently Amended) A head suspension ~~for supporting a head assembly in cooperative engagement with a rotating disc in a disc drive, the head suspension mounted to an actuator for controllably moving the head assembly radially over a surface of the disc, the head suspension comprising:~~

a gimbal portion ~~for mounting the head assembly and providing compliance in roll and pitch axes of the head assembly;~~

a load beam portion ~~for exerting to exert~~ a load force on ~~the~~ a head assembly relative to a load point and the gimbal portion supporting the head assembly to roll about a roll axis; and

means for controlling roll attitude of the head assembly based upon a radial position of the head assembly in relation to ~~the~~ a disc.

2. (Canceled)

3. (Currently Amended) A disc drive comprising:

a rotating disc mounted for rotation in the disc drive;

a head assembly ~~for recording digital information to and retrieving information from the disc;~~

a head suspension including a load portion adapted to supply a load force to the head assembly at a load point and a gimbal portion to allow the head assembly to pitch and roll relative to the load point;

an actuator coupled to the head suspension to move the head assembly ~~radially~~ relative to the disc; and

means for dynamically controlling a roll attitude of the head assembly.

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4. (Canceled)

5. (Canceled)

6. (Canceled)

7. (Currently Amended) ~~A head suspension for mounting a head assembly in cooperative engagement with a rotating disc in a disc drive, the head suspension mounted to an actuator for controllably moving the head assembly radially over a surface of the disc, the head suspension comprising:~~

~~a load beam portion for exerting to exert a load force on the a head assembly relative to a load point;~~

~~a gimbal portion having the head assembly coupled thereto to allow the head assembly to pitch and roll relative to the load point and the gimbal portion including opposed spaced gimbal beams on opposed sides of the load point; and~~

~~a plurality of bending assemblies including a first bending assembly coupled to one of said gimbal beams and a second bending assembly coupled to another of said gimbal beams and the first and second bending assemblies being energizable to adjust pitch and roll attitudes of the head assembly.~~

8. (Currently Amended) ~~A~~ The head suspension as claimed in claim 7, wherein the first bending assembly includes a first bending element energizable via a first electrical interface coupled to the first bending element and the second bending assembly includes a second bending element energizable via a second electrical interface coupled to the second bending element to independently energize the first and second bending elements to adjust the roll attitude of the head assembly.

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9. (Currently Amended) ~~A~~ The head suspension as claimed in claim 7, wherein:

the first bending assembly includes a first bending element on the one of said gimbal beams and the second bending assembly includes a second bending element on the other of said gimbal beams and the first and second bending elements are formed of a thermally expandable material forming a bi-metal structure having different coefficients of thermal expansion.

10. (Canceled)

11. (Currently Amended) ~~A~~ The head assembly-suspension as claimed in claim 7 wherein: the plurality of bending assemblies include a bending element formed of a piezoelectric material.

12. (Currently Amended) ~~A~~ The head suspension as claimed in claim 7, wherein:

the first bending assembly includes a first bending element on the one of said gimbal beams and the second bending assembly includes a second bending element on the other of said gimbal beams and the first and second bending elements have an elongated length extending along an elongated length portion of the gimbal beams.

13. (Canceled)

14. (Currently Amended) ~~A~~ The head suspension as claimed in claim 8, wherein the first and second bending elements include opposed leading and trailing ends and the first and second electrical

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interfaces include opposed leads coupled proximate to the opposed leading and trailing ends of the first and second bending elements.

15. (Canceled)

7. 16. (Currently Amended) A head suspension ~~for mounting a head assembly in cooperative engagement with a rotating disc in a disc drive, the head suspension mounted to an actuator for controllably moving the head assembly having a leading edge, a trailing edge and opposed sides radially over a surface of the disc, the head suspension comprising:~~

a load beam portion ~~for exerting to exert~~ a load force on the a head assembly relative to a load point;

a gimbal portion having the head assembly coupled thereto to allow ~~the a~~ leading edge of the head assembly to pitch about a pitch axis and ~~the~~ opposed sides of the head assembly to roll about a roll axis relative to the load point;

the gimbal portion further including a plurality of bending elements including at least one bending element on a first side of the roll axis and at least one bending element on a second opposed side of the roll axis actuatable to adjust a roll attitude of the head assembly relative to the roll axis.

17. (Currently Amended) A The head suspension as claimed in claim 16, wherein:

the plurality of bending elements are formed of a thermally expandable material forming a bi-metal structure having different coefficients of thermal expansion or a piezoelectric material.

E.I. Cor. 18. (Currently Amended) A-The head suspension as claimed in claim 16, wherein:

the gimbal portion further comprises a pair of longitudinally extending gimbal beams and a connecting cross member between distal ends of the pair of gimbal beams; and

the plurality of bending elements are mounted on the connecting cross member.

19. (Canceled)

20. (Currently Amended) A-The head suspension as claimed in claim 16, wherein:

the gimbal portion further comprises a pair of longitudinally extending gimbal beams; and

the plurality of bending elements are mounted on the pair of gimbal beams.

21. (Currently Amended) A-The head suspension as claimed in claim 16, wherein:

a first electrical interface is coupled to the at least one bending element on the first side of the roll axis and a second electrical interface is coupled to the at least one bending element on the second opposed side of the roll axis to independently energize the first and second bending elements to adjust the roll attitude of the head assembly.

22. (Canceled)

23. (Canceled)

24. (Canceled)

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25. (Canceled)

26. (Canceled)

27. (Canceled)

28. (Canceled)

29. (Canceled)

30. (Canceled)

31. (Canceled)

32. (Canceled)

33. (Canceled)

34. (Currently Amended) The head suspension ~~assembly~~ of claim 1 wherein the means for controlling the roll attitude includes a plurality of bending elements on opposed sides of the roll axis.

35. (Currently Amended) The head suspension ~~assembly~~ of claim 34 wherein the plurality of bending elements are formed of a thermally expandable material forming a bi-metal structure having different coefficients of thermal expansion or a piezoelectric material.

36. (Currently Amended) The head ~~assembly~~ suspension of claim 34 wherein the plurality of bending elements are independently energized relative to the radial position of the head assembly in relation to the disc.

37. (Currently Amended) The head ~~assembly~~ suspension of claim 9 wherein the opposed spaced gimbal beams have a different coefficient of thermal expansion than the first and second bending elements to form the bi-metal structure having the different coefficients of thermal expansion.

38. (Currently Amended) The head ~~assembly~~ suspension of claim 7 wherein the first and second bending assemblies are energized based upon a radial position of the head assembly relative to ~~the~~ a disc.

39. (Currently Amended) A head assembly comprising:

- a head suspension ~~assembly including a gimbal portion;~~
- a head ~~assembly~~ coupled to the ~~gimbal portion~~ suspension to ~~pitch and roll about a pitch axis and a roll axis defined relative to a load point; and~~
- a bending assembly ~~including bending elements spaced from the roll axis and the bending assembly being energizable to adjust a roll attitude of the head assembly relative to the roll axis; and~~
- a controller coupled to the bending assembly to adjust the roll attitude of the head based upon a radial position of the head.

40. (Currently Amended) The head assembly of claim 39 wherein the bending assembly includes a first bending element spaced from the roll axis in a first direction and a second bending element spaced from the roll axis in a second direction opposite to the first direction and the controller is coupled to the first and second bending elements to adjust the roll attitude of the head.

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41. (Currently Amended) A method for controlling a roll attitude of a head assembly ~~of a disc drive~~ comprising steps of:

rotating a disc to provide a lifting force to the head assembly; and

energizing a bending ~~element~~assembly ~~spaced from a roll axis of the head assembly~~ to adjust the roll attitude of the head assembly.

42. (Currently Amended) The method of claim ~~39~~41 wherein the step of energizing further comprises energizing a plurality of bending elements to adjust the roll attitude of the head assembly.

43. (Currently Amended) The method of claim ~~39~~41 including a first bending element on a first side of ~~the~~a roll axis and a second bending element on a second opposed side of the roll axis and the step of energizing the bending ~~element~~assembly energizes one of the first or second bending elements.

44. (Currently Amended) The method of claim ~~39~~41 including a first bending element on a first side of ~~the~~a roll axis and a second bending element on a second opposed side of the roll axis and the step of energizing the bending ~~element~~assembly energizes the first and second bending elements.

45. (Currently Amended) The method of claim ~~42~~44 wherein the first bending element is energized to bias the head assembly in a first direction and the second bending element is energized to bias the head assembly in a second direction opposite to the first direction to adjust the roll attitude of the head assembly.
